

WHITE'S BRIDGE
Spanning Flat River, White's Bridge Road
Smyrna
Ionia County
Michigan

HAER MI-331
MI-331

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

WHITE'S BRIDGE

HAER No. MI-331

LOCATION: Spanning Flat River at White's Bridge Road, Smyrna, Ionia County,
Michigan
UTM: 16.638704.4763854, Smyrna, Michigan Quadrangle

STRUCTURAL
TYPE: Brown through truss covered bridge

DATE OF
CONSTRUCTION: 1869

DESIGNER/
BUILDER: Jared N. Bresee and Joseph H. Walker

OWNER: Ionia County, Michigan

PREVIOUS USE: Vehicular bridge

PRESENT USE: Vehicular bridge

SIGNIFICANCE: White's Bridge is one of two surviving examples of a Brown truss covered bridge in the United States.¹ Patented by Josiah Brown, Jr. in 1857, the Brown truss represents a mid-nineteenth century flowering of innovations in American timber bridge design.

HISTORIAN: Researched and written by Lola Bennett, November 2003

PROJECT
INFORMATION: The National Covered Bridges Recording Project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. HAER is administered by the Historic American Buildings Survey/Historic American Engineering Record, a division of the National Park Service, U.S. Department of the Interior. The Federal Highway Administration funded the project.

¹ Sometime between 1845 and 1856, Levi White purchased the adjacent property and the crossing became known as White's Bridge.

Chronology

- 1805 America's first covered bridge built at Philadelphia
- 1832 Jared Bresee born in New York
- 1845 First bridge, a floating log bridge, built at this site
- 1856 Second bridge built at this site, known as "White's Bridge"
- 1857 Josiah Brown patents Brown truss
- 1859 Jared Bresee moves to Michigan from New York
- 1867 William Holmes builds Brown truss covered bridge at Ada, Michigan
- 1868 Jared Bresee and Joseph Walker build Brown truss covered bridge at Greenville
- 1869 White's Bridge destroyed by ice
- 1869 Third bridge built at this site
- 1871 Jared Bresee builds Brown truss covered bridge at Fallasburg
- 1936 Ionia County Road Commission repairs White's Bridge
- 1965 White's Bridge listed on the National Register of Historic Places
- 1967 Ionia County Road Commission rehabilitates White's Bridge
- 1991 White's Bridge roof replaced
- 1995 White's Bridge rehabilitated
- 2003 White's Bridge recorded by the Historic American Engineering Record

Introduction

Some of the earliest covered bridges in Michigan were built at major river crossings at Grand Rapids and Lansing in the 1850s. Historians estimate that by the late nineteenth century, Michigan's covered bridges numbered in the hundreds.² Over time, covered bridges were lost to floods, and many more were systematically replaced in the early twentieth century. By 1957, only five covered bridges remained, including one moved from Pennsylvania to Henry Ford's Greenfield Village in 1938. In 1980, a modern covered bridge was built at Frankenmuth and a historic covered bridge was rebuilt at Ada, giving Michigan its present total of six covered bridges.³

Description

White's Bridge is a single-span Brown truss timber covered bridge on mortared fieldstone abutments. The total length of the bridge is 120', with a clear span of approximately 116'. The truss is 15'-8" high from the top of the upper chord to the bottom of the lower chord and 18'-2" wide overall, with a width of 16' between the centerline of the trusses.

The trusses have fourteen panels and are framed in the manner patented by Josiah Brown in 1857. The upper and lower chords are composed of four parallel lines of 4x12" timbers separated by spacer blocks and bolted together. The chords are connected by vertical endposts (paired 5½" x 5½" timbers), vertical center posts (paired 6x6" timbers) and a series of diagonal braces (paired 6x6" timbers) and counter braces (single 6x6" timbers in the middle panels and 6x8" timbers in the panels toward the ends). The web members are notched to pass between the chord members and are bolted at each intersection with two large bolts.

The floor system appears to be partly new. On the lower chord, 4x10" transverse floor beams are seated at approximately every 2'. There are eight lines of 3x8" stringers placed longitudinally on top of the floor beams. The floor is 2½"x9" planks laid transversely on top of the stringers. There are two lines of running boards on top of the deck, each composed of three boards totaling 2½' wide. There is new lower lateral X-bracing (4x6" boards) and ¾" diameter iron tie rods between the lower chords. The lower chords rest on bolster beams (paired 10x11" timbers) cantilevered about 5' beyond the faces of the abutments and bolted to the lower chord. These were apparently added at an unknown date to reduce the clear span length. The abutments are mortared, rough-faced fieldstone masonry with later poured concrete caps and backwalls.

The upper lateral system is composed of eight 4x6" transverse tie beams seated on the upper chord along the length of the truss and 4x6" X-bracing crossing over two panels. The ends of the cross bracing are seated on boards nailed to the inner faces of the upper chords. There is a ¾" diameter iron tie rod running transversely between the upper chords at every other panel point.

² Charles K. Hyde, *Historic Highway Bridges of Michigan* (Detroit: Wayne State University Press, 1993), p.23.

³ See Milton Graton, "The Building of Zehnder's Holz-Brucke," in *The Last of the Covered Bridge Builders* (Plymouth, New Hampshire: Clifford-Nicol, Inc., 1990 edition), p.149-71.

Rafters are 2x6s spaced at 5'-0" framing from the outer edge of the upper chords diagonally up to the ridgepole. There are collar ties between the rafters. The gable roof has a 1' overhang and is covered with wood shingles fastened to purlins on top of the rafters.

Naturally weathered, rough-sawn vertical planks (approximately $\frac{3}{4}$ "x12") cover the exterior of the bridge to 3' below the eaves. The siding is nailed to three longitudinal 3x4s fastened to the outer faces of the trusses. The straight portals have squared openings with clipped corners.

History

White's Bridge is the third bridge erected at this site. The first bridge, reportedly a floating log bridge, was built in 1845. According to Keene Township records, on November 17, 1845, the highway commissioners of Keene and Otisco townships "let the job of building a bridge across Flat River at the Cutler place to Ambrose Spencer for \$79."⁴

The second bridge was built in 1856, when the two townships appropriated \$250 "for the purpose of building a bridge across Flat River at or near the site of a bridge known as White's Bridge."⁵

Ice destroyed the second bridge in the spring of 1869, and local residents immediately petitioned for a replacement. On April 22, 1869, the Keene Township Commissioners of Highways let the contract for White's Bridge "to Brezee & Walker for the sum of Seventeen Hundred Dollars."⁶ White's Bridge was built in the summer of 1869 and accepted by Keene Township on October 1, 1869.⁷

White's underwent repairs in 1936 and rehabilitation in 1967. The roof was replaced in 1991 with wood shingles. The deck also appears to be new.

Builders

Jared N. Bresee was born in New York in 1832 and moved to Michigan in about 1859.⁸ He lived in Ada, Michigan, and was listed as "Master Carpenter" in the 1860 Federal census. From 1873 to 1898, Grand Rapids City directories listed him as a bridge builder, bridge inspector or bridge contractor. He died in Walker Township, Kent County, Michigan, January 28, 1918 at the age of 86.

⁴ Keene Township Records. Note: At that time, the northwest corner of Keene Township was part of Otisco Township, with the Flat River forming a natural boundary between the two jurisdictions.

⁵ Keene Township Records, 1859.

⁶ Keene Township Records, April 22, 1869.

⁷ Keene Township Records, October 1, 1869.

⁸ Sometimes spelled "Brazee" or "Brezee," but more consistently spelled "Bresee."

Joseph H. Walker was born in Vermont in 1830 and came to Michigan with his family in 1832.⁹ He learned carpentry from his father and, as a young man, built houses and barns in Kent County. Sometime between 1860 and 1868, Walker formed a partnership with Jared Bresee, with whom he contracted for both road and railroad bridges.¹⁰ In 1870, Walker became associated with the Grand Rapids Burial Case Company (later, Powers & Walker Casket Company), manufacturers of caskets and coffins. He died in Grand Rapids, Michigan, on May 18, 1910, at the age of 80.

Design

Little is known about Josiah Brown, Jr. of Buffalo, New York. In about 1855, he invented a bridge truss system, but the patent office rejected his first application. After a written appeal, Brown obtained a U.S. patent on June 26, 1857.¹¹

The Brown truss featured paired braces and single counterbraces mortised and bolted at the chords. Brown claimed that by notching the chords and braces together “they shall become as it were one piece,” resulting in a lighter, stronger bridge.¹² Unfortunately, by having the braces and counters bear at the panel points and by notching the tension members at their most vulnerable point, the Brown truss was not as strong as other truss types, such as the Paddleford and Smith trusses, and never made it into the mainstream of covered bridge building.¹³

The Brown truss appears to have dead-ended in Michigan, although how it came to be use there is not clear from existing records.¹⁴ In 1867, William Holmes built a bridge of this type at Ada, Michigan.¹⁵ It is likely, though not documented, that Jared Bresee played a role in its construction. At the very least, the Ada Bridge served as a model for several bridges that Bresee built in subsequent years:

⁹ History of Kent County, Michigan (Chicago: Chas. C. Chapman & Co., 1881), p.1155.

¹⁰ “Sudden Death of Joseph H. Walker,” *Grand Rapids Herald*, May 19, 1910, p.6.

¹¹ Since the Brown patent mentions George W. Thayer, it is possible that Brown’s first patent application was rejected because of similarities to Thayer’s 1845 patent.

¹² Josiah Brown, Jr., United States Letters Patent No. 17,722, 7 July 1857.

¹³ Brian J. McKee, “Smith, Partridge and Brown Trusses as They Were Really Built,” *Covered Bridge Topics* 58 (Summer 2000): 13-15.

¹⁴ Further research is needed concerning Josiah Brown (e.g. Did Josiah Brown build any bridges of this type in New York State and did he have personal or professional connections with William Holmes or Jared Bresee?)

¹⁵ According to a 1957 Kent County Road Commission Report, during some repair work on Ada Bridge, a timber was uncovered bearing the description: “J. Brown-Patented 1857.”

22-41-01	Ada Bridge	Kent County, MI	1867	William Holmes	125' Brown truss	Burned/rebuilt 1980
	Greenville Bridge	Montcalm County, MI	1868	Bresee & Walker	Brown truss	Replaced 1885
22-34-01	White's Bridge	Ionia County, MI	1869	Bresee & Walker	120' Brown truss	
22-41-02	Fallasburg Bridge	Kent County, MI	1871	Jared Bresee	100' Brown truss	Modified?

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